

What is claimed is:

1 1. A data communication system comprising:

2 a plurality of radio devices communicating together in groups defining  
3 networks, at least certain member devices of the networks transmitting on the  
4 respective said network during time slots and at radio frequencies determined  
5 by a frequency hopping sequence;

6 wherein at least two of said groups having different frequency hopping  
7 sequences are sufficiently related that messages transmitted by at least two of  
8 the member devices can collide by causing at least one of co-channel and  
9 related channel interference between messages of the at least two said groups;

10 wherein at least one of the devices compares the different radio  
11 frequency hopping sequences of the at least two said groups and identifies time  
12 slots at which said sequences coincide sufficiently to produce said interference;  
13 and,

14 wherein at least one of said networks alters its behavior during the time  
15 slots at which the sequences coincide sufficiently to produce said interference,  
16 in a manner that reduces one of an incidence and an effect of collisions during  
17 the time slots when the sequences collide.

1 2. The data communication system of claim 1, wherein the groups having  
2 different frequency hopping sequences are sufficiently close in at least one of  
3 physical proximity and signal strength to produce said collisions.

1 3. The data communication system of claim 1, wherein each of the networks  
2 comprises a master device and at least one slave device, wherein the master  
3 device determines the radio frequency hopping sequence for the network,  
4 observed by the master device and at least one slave device.

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- 1 4. The data communication system of claim 2, wherein the devices have  
2 unique addresses and the radio frequency hopping sequence for each said  
3 network is derived from the unique address of the master device of said  
4 network.
- 1 5. The data communication system of claim 1, wherein at least one of the  
2 networks that alters its behavior abstains from transmitting during the time  
3 slots at which the sequences collide.
- 1 6. The data communication system of claim 1, wherein at least one of the  
2 networks that alters its behavior changes at least one of transmission power  
3 and error correction level, during the time slots at which the sequences collide.
- 1 7. The data communication system of claim 1, wherein said at least one of the  
2 networks that alters its behavior is chosen according to a priority repetitively  
3 based upon a comparison of operational criteria of the networks.
- 1 8. The data communication system of claim 7, wherein the priority is accorded  
2 anew for each of the time slots at which the sequences coincide.
- 1 9. The data communication system of claim 7, wherein the priority is accorded  
2 based on a comparison of the devices and the networks for at least one of: a  
3 power level of transmissions in at least one direction between the devices, an  
4 interference level of said transmissions, an error level of the transmissions, a  
5 data throughput of the respective networks, a battery condition, a message  
6 latency, a number of previous attempts to transmit, a capture effectiveness,  
7 message urgency, terms of a subscription and device type.
- 1 10. The data communication system of claim 9, wherein the priority is  
2 accorded in a manner tending to optimize data throughput for the devices on  
3 all the networks.

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1 11. The data communication system of claim 1, wherein the network is  
2 configured according to at least one of IEEE standard 802.11, a Bluetooth  
3 scatter network, a Home RF network and a Metricom Ricochet network.

1 12. A method of data communication using a plurality of peer devices,  
2 comprising the steps of:

3 establishing wireless frequency hopping communications between two  
4 or more of the devices such that a plurality of the devices associated as  
5 members of a first wireless network are synchronized to time slots and  
6 operable to step through a predetermined frequency hopping sequence;

7 establishing wireless frequency hopping communications between two  
8 or more of the devices such that a different plurality of the devices are similarly  
9 associated as members of a second wireless network operable to step through a  
10 different predetermined frequency hopping sequence, wherein the frequency  
11 hopping sequences of the first and second wireless networks differ but can  
12 coincide in particular time slots;

13 comparing the frequency hopping sequences of the first and second  
14 wireless networks over a prediction interval and identifying time slots in which  
15 said frequency hopping sequences coincide;

16 altering a behavior of at least one of the first and second wireless  
17 networks such that one of the first and second wireless networks has improved  
18 ability to receive during said time slots in which the frequency hopping  
19 sequences coincide.

1 13. The method of claim 12, wherein the frequency hopping sequences are  
2 compared and the priorities are assigned by at least one master device  
3 synchronizing one of the networks.

1 14. The method of claim 12, wherein at least some of the devices are mobile  
2 devices operable to join and to depart said wireless networks from time to time.

1 15. The method of claim 13, wherein the at least one master is operable to  
2 cause an associated at least one of the first and second networks to abstain from  
3 communicating during said time slots in which the frequency hopping  
4 sequences coincide.

1 16. The method of claim 13, wherein the at least one controller is operable to  
2 cause an associated at least one of the first and second networks to alter its  
3 behavior by at least one of abstinence and a change of at least one of  
4 transmission power and error correction level during time slots in which the  
5 frequency hopping sequences coincide.

1 17. The method of claim 12, wherein the behavior is altered according to  
2 priorities assigned and reassigned periodically based upon current conditions  
3 of the first and second networks.

1 18. The method of claim 17, wherein the priorities are assigned for each  
2 instance in which the frequency hopping sequences coincide.

1 19. The method of claim 18, wherein the priority is accorded based on a  
2 comparison of the devices and the networks for at least one of: a power level of  
3 transmissions in at least one direction between the devices, an interference  
4 level of said transmissions, an error level of the transmissions, a data  
5 throughput of the respective networks, a battery condition, a message latency,  
6 a number of previous attempts to transmit, a capture effectiveness, message  
7 urgency, terms of a subscription and device type.

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